

HASP Addendum Page

This form should be completed for new tasks associated with the project. The project manager and/or task manager should revise the Project Hazard Analysis Worksheet with the new task information and attach to this addendum sheet. JLAS should be developed for any new tasks and attached as well.

Review the addendum with all site staff, including subcontractors, during the daily tailgate briefing, and complete the tailgate briefing form as required. Attach a copy of the addendum to all copies of the HASP including the site copy, and log in the Addendum Log Table A-1 on the next page.

Addendum Number: 4 Project Number: GP000677.2012

Date of Changed Conditions: 27 August 2012 Date of Addendum: 27 August 2012

Description of Change that Results in Modifications to HASP:

Chemical hazard description by exposure route, associated symptoms with overexposure and the corresponding NIOSH REL, ACGIH TLV and Oregon PEL where established. Action levels for each chemical describing appropriate respiratory protection and site withdrawal based on 10 percent of the LEL and one half of the TLV. These changes are specific to site worker protection. Action levels will be based on readings taken from the breathing zone. Physical hazards associated with the site are presented in the attached JSAs.

Signed: Connstance M. Cole
Connie Cole
Project Manager

Signed: _____
TBD
Site Safety Officer

Signed: Kimberly Walsh
Kimberly Walsh, MPH
H&S Plan Writer

Signed: Greg Ertel
Greg Ertel, CIH
H&S Plan Reviewer

1. Purpose

1.1. Purpose and Background

This addendum provides the following information regarding air monitoring procedures specific to site worker exposure:

- Historical air monitoring data used for hazard identification (see attached data tables)
- Detailed chemical hazards that may be encountered at the Site, major routes of exposure and the symptoms associated with overexposure
- Occupational exposure limits (OELs) as set by NIOSH and ACGIH as well as Oregon permissible exposure limits (PEL)
- Real time instruments utilized for analyte detection
- Action levels for Stop Work, evacuation and evaluation of engineering controls and personal protective equipment (PPE) upgrade.
 - In 2012, hydrogen cyanide was detected at concentrations exceeding OELs inside structures associated with both the RCRA and CERCLA landfills (Attachment, Tables 1a and 1b). The maximum detected concentration of hydrogen cyanide in 2012 was 191 ppm inside Manhole 4 at the CERCLA landfill. Historical data (2004-2005; see Attachment A, Table 1) from inside landfill structures included a maximum recorded concentration of 994 ppm. Further, more than 50% LEL conditions and methane have been detected inside these structures.
 - Historical ambient air sampling data representative of pre-remediation conditions indicates that chemicals of concern were present in ambient air at concentrations well below the OELs (Geraghty & Miller, 1988). The air sampling and analysis was conducted prior to landfill closure and conditions have changed. Treatment activities have been performed at the landfills and accompanying leachate collection and treatment systems since closure was completed. These activities may have resulted in an increase in hydrogen cyanide and methane emissions. Air monitoring is warranted to evaluate the changed conditions.
- Physical hazards are presented in the Job Safety Analyses (JSAs)
- Emergency contacts
- Route to the hospital map

2. General Procedures

- The initial level of PPE for work within 20 feet of potential point sources (e.g., vents, sumps, manholes, and utility buildings) will be Level C consisting of full-face air purifying respirators equipped with combination particulate/multi-gas cartridges (olive and magenta cartridges; North 75SCP100- Defender™ Multi-Purpose with P100 or equivalent), butyl rubber gloves to control potential skin exposure to hydrogen cyanide while positioning sampling equipment, and Tychem BR coveralls or equivalent. Depending on weather conditions during the sampling, use of Tychem BR coveralls or equivalent may introduce a significant heat stress hazard. The field team shall implement the buddy system and monitor each other for signs of heat stress. If heat stress is observed, then work/rest cycles will be used to control this hazard. Please see the project HASP and Field Manual for procedures.
- Note that for hydrogen sulfide protection, the air purifying respirator with above cartridges is only for escape use. In the event of hydrogen sulfide in the breathing zone, the field crew will withdraw, contact the project CIH, and prepare to implement engineering controls or upgrade to supplied air.
- Given available air monitoring and sampling data collected to date, and that action levels are not expected to be exceeded in the breathing zone, air monitoring readings greater than action levels will trigger withdrawal from the site and re-evaluation of chemical hazards and controls. The field team will be prepared to upgrade to supplied air and Tychem BR coveralls, if warranted, after re-evaluation of inhalation and dermal hazards with the project CIH or designee. The designee shall be a trained health and safety professional working under the direction and control of the project CIH. The upgrade action levels are discussed in Section 3.
- For monitoring and sampling utility buildings, air concentrations at the vents and around doorways will be monitored or sampled from the exterior while the building is closed. Air monitoring personnel will be in Level C PPE for this task. For the case of the RCRA utility building, probes will be attached to the monitors and extended into the structure through wall vents and doors. Once monitored, the building will be opened and vented for a minimum of 5 minutes before entry to monitor sump gases. While personnel are in the building, doors will remain open.
- The initial level of PPE will be Level D for fence line monitoring.
- Field personnel should position themselves upwind of potential sources to the extent practical.
- Air monitoring will be conducted starting from the perimeter (fence line) of the Site and moving inward towards the vents/sumps.
- Action levels are to be applied to sustained readings taken from the breathing zone.
- Readings should be taken from the breathing zone of the most exposed individual.
- Action levels are based on one-half the TLV unless the Oregon PEL is lower (more protective) or 10 percent of the Lower Explosive Limit (LEL) depending on the chemical.
- The buddy system will be employed. Field crews will consist of a minimum of two people in sight of each other with some form of communication to emergency response services (e.g., cell phone or radio).
- Non-sparking tools and intrinsically safe equipment are required for the project.

3. Chemical Hazards

- Table 1 presents the chemicals of concern, major routes of exposure, symptoms associated with overexposure and occupational exposure limits
- Table 2 presents the instrumentation to be used, action levels and action to take for each chemical of concern

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- All chemicals will be measured in real-time
- Hydrogen cyanide and hydrogen sulfide will be monitoring continuously using alarm mode.

3.1. Methane

- Methane will be measured using the MX6 I-Brid by Industrial Scientific with the combustible sensor. The action level for withdrawal will be based on 10 percent of the LEL.

3.2. Oxygen

- Oxygen will be measured using the MX6 I-Brid by Industrial Scientific with the Oxygen sensor. The action level for withdrawal is based on the presence of oxygen enriched or oxygen deficient conditions. The definition of an oxygen deficient environment is less than 19.5 percent oxygen and the definition of an oxygen enriched environment is 21.5 percent oxygen.

3.3. Hydrogen Sulfide (H₂S)

- H₂S will be measured using the MX6 I-Brid by Industrial Scientific with the H₂S/CO sensor. The action level for H₂S withdrawal is 0.5 ppm (one-half ACGIH TLV). Hydrogen sulfide has poor warning properties due to the potential for olfactory fatigue. Field personnel are prohibited from using sense of smell as a method for detecting H₂S in the breathing zone. Air purifying respirators are to be used only for escape if H₂S is detected in the breathing zone.

3.4. Carbon Dioxide (CO₂)

- Carbon Dioxide will be measured using the MX6 I-Brid by Industrial Scientific with a CO₂ specific sensor. The action level for withdrawal is 2500 ppm (one-half ACGIH TLV).

3.5. Hydrogen Cyanide (HCN)

- HCN will be measured using the MX6 I-Brid by Industrial Scientific with the toxic sensor. The action level for withdrawal is set at 1 ppm (below one-half ACGIH TLV at the instrument detection limit). Since cyanide has poor warning properties (sense of smell and irritation are unreliable; <http://www.cdc.gov/niosh/docs/81-123/pdfs/0333.pdf>) and a very low ceiling value (4.7 ppm), detectable concentrations (i.e., greater than 1 ppm) in the breathing zone of the most exposed worker will trigger withdrawal from the source area and evaluation of additional engineering or work practice controls and/or PPE to reduce to exposure will be conducted. For hydrogen cyanide, exposure via dermal absorption can contribute significantly to a toxic dose. Therefore, hazard control could include upgrade to supplied air (Level B) and would be accompanied by upgrade to Tychem BR coveralls or equivalent protection for hydrogen cyanide.

3.6. Hydrogen

- Hydrogen gas will be measured using the MX6 I-Brid by Industrial Scientific using the combustible sensor. The action level will be based on 10 percent of the LEL.

3.7. Hydrofluoric Acid

- Hydrofluoric acid will be measured using colorimetric detector tubes with a measuring range of 0.2 to 30 ppm (Sensidyne 156S or equivalent). The action level is 0.25 ppm (one-half the ACGIH TLV).

3.8. Acetylene

- Acetylene will be measured using the MX6 I-Brid by Industrial Scientific. The action level for withdrawal is set at 1250 ppm (one-half ACGIH TLV).

3.9. Phosphine

- Phosphine will be measured using the MX6 I-Brid by Industrial Scientific. The action level for withdrawal is set at 0.15 ppm (one-half ACGIH TLV).

3.10. Ammonia

- Ammonia will be measured using the MX6 I-Brid by Industrial Scientific. The action level for withdrawal is set at 12.5 ppm (one-half ACGIH TLV).

4. Monitoring Procedures

- Monitoring will begin at the perimeter of the Site (i.e., fence line) and move inward.
- The air monitoring instrument will be operated continuously and in alarm mode for hydrogen cyanide and hydrogen sulfide during tasks within 20 feet of potential point sources. Detectable concentrations of either of these chemicals in the breathing zone will result in withdrawal from the site,
- Readings for chemicals other than H₂S and hydrogen cyanide at potential source areas, and for all chemicals along the perimeter will be taken in the breathing zone every 30 minutes while at work on a continuous task in one location. If the readings continue to result in non-detects after four (4) 30-minute intervals (2 hours), readings can then be taken every hour.
- Once the task or location has changed, readings shall resume in the breathing zone every 30 minutes until four consecutive non-detect readings are obtained.
- Wind direction can be determined by utilizing a wind sock or flag. Place in an elevated area (if possible) for clear visibility.

5. MX6 I-Brid by Industrial Scientific Calibration Information

- Calibrate the detector before first-time use and then on a regular schedule, depending on use and sensor exposure to poisons and contaminants. Manufacturer recommends once every 180 days (6 months).
- Manufacturer recommends to "bump test" the sensors, before each day's use, to confirm their ability to respond to gas by exposing the detector to a gas concentration that exceeds

the high alarm set points. Manually verify that the audible and visual alarms are activated. Calibrate if the readings are not within the specified limits.

- The combustible sensor is factory calibrated to 50 percent LEL methane. If monitoring a different combustible gas in the percent LEL range, calibrate the sensor using the appropriate gas. High off-scale % LEL or % v/v methane readings may indicate an explosive concentration.
- Any rapid up-scaling reading followed by a declining or erratic reading may indicate a gas concentration beyond upper scale limit, which may be hazardous.
- Do not turn off the detector during a work shift. TWA and STEL readings reset if the detector is deactivated for more than 5 minutes.

6. Physical Hazards

- Physical hazards relating to air monitoring activity can be found in the attached JSAs. The JSAs include personal protective equipment (PPE), job step descriptions and supplies required for the Site.
- Information relating to driver safety can be found in the attached JSA specific to driving commercial vehicles.



Emergency Contact Information

Local Police – City of The Dalles	911 and 541.296.5481
Local Ambulance – Dufur Ambulance	911 and (541) 467-2349
Local Fire Department – Mid-Columbia Fire and Rescue	911 and 541.296.9445
Local Hospital – Mid-Columbia Medical Center	541.296.1111
Local Weather Data	Weather.com
Poison Control	800.332.3073
National Response Center (all spills in reportable quantities)	800.424.8802
U.S. Coast Guard (spills to water)	800.424.8802
ARCADIS Project Manager – Connie Cole	406.449.7001
ARCADIS H&S Manager – Kurt J Merkle	267.685.1861
Client Contact – Gene Matsushita Bill Bath	818.847.0197 (office) 310.292.0842 (emergency number) 720-842-6106 (direct) 303-229-7063 (cell)
WorkCare	1.800.455.6155

References:

Geraghty & Miller, 1988. Final Remedial Investigation Report. Volume 1. Martin Marietta Reduction Facility, The Dalles, Oregon.

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ATTACHMENT

Historical Air Monitoring Data

Table 1a. RCRA LANDFILL AIR MONITORING
LMC Site, The Dalles, Oregon

Date	Time	Location	Air Monitoring				Notes			
			LEL (%)	CH ₄ (ppm)	O ₂ (%)	H ₂ S (ppm)	CO ₂ (%)	HCN (ppmv)	Wind speed for entire event at 1-3 mph, changing directions.	
		Vent 1								
7/7/12	10:37	Source	45	84	13	56	0.03	300	105	Readings inside vent. CH ₄ and HCN over limit.
	10:45	Worker Exposure 1U	ND	ND	20.9	ND	ND	ND	ND	5 feet elevation above ground, one foot upwind.
	10:47	Worker Exposure 1D	ND	ND	20.9	ND	ND	ND	ND	5 feet elevation above ground, one foot downwind.
	10:50	Worker Exposure 5U	ND	ND	20.9	ND	ND	ND	ND	5 feet elevation above ground, five feet upwind.
	10:54	Worker Exposure 5D	ND	ND	20.9	ND	ND	ND	ND	5 feet elevation above ground, five feet downwind.
	10:56	Cross wind 1N	ND	ND	20.9	ND	ND	ND	ND	Cross wind - 1 and 5 ft crosswind, same criteria.
	10:59	Cross wind 1S	ND	ND	20.9	ND	ND	ND	ND	
	11:02	Cross wind 5N	ND	ND	20.9	ND	ND	ND	ND	
	11:05	Cross wind 5S	ND	ND	20.9	ND	ND	ND	ND	
		Vent 2								
7/7/12	10:10	Source	52	96	12.5	57	0.04	400	95.4	Readings inside vent. CH ₄ and HCN over limit.
	10:16	Worker Exposure 1U	ND	ND	20.9	ND	ND	ND	ND	5 feet elevation above ground, one foot upwind.
	10:18	Worker Exposure 1D	ND	ND	20.9	ND	ND	ND	ND	5 feet elevation above ground, one foot downwind.
	10:21	Worker Exposure 5U	ND	ND	20.9	ND	ND	ND	ND	5 feet elevation above ground, five feet upwind.
	10:25	Worker Exposure 5D	ND	ND	20.9	ND	ND	ND	ND	5 feet elevation above ground, five feet downwind.
	10:27	Cross wind 1N	ND	ND	20.9	ND	ND	ND	ND	Cross wind - 1 and 5 ft crosswind, same criteria.
	10:29	Cross wind 1S	ND	ND	20.9	ND	ND	ND	ND	
	10:31	Cross wind 5N	ND	ND	20.9	ND	ND	ND	ND	
	10:35	Cross wind 5S	ND	ND	20.9	ND	ND	ND	ND	

Source Inside vent cap at elbow.

LEL - Lower Explosive Limit.

CH₄ - Methane.

O₂ - Oxygen. Ambient concentration typically 20.9 percent.

H₂S - Hydrogen Sulfide.

HCN - Hydrogen Cyanide.

CO₂ - Carbon Dioxide. Ambient concentrations typically 300-600 ppm.

Notes: This air monitoring, done at request of ODEQ (Fredrick Moore), was not conducted using an approved Sampling and Analysis Plan (SAP).

Manufacturer's instructions were followed for use of portable air sampling equipment and both monitors were calibrated prior to use.

The HCN monitor was calibrated to a range of 0 - 100 ppm. The extended range is 100 - 500 ppm, but this data is outside the calibration limits.

The CO₂ monitor was zeroed to ambient conditions. The results do not include ambient CO₂ concentrations.

Table 1a. RCRA LANDFILL AIR MONITORING
LMC Site, The Dalles, Oregon

Date	Time	Location	Air Monitoring				Notes		
			LEL (%)	CH ₄ (ppm)	O ₂ (%)	H ₂ S (ppm)	CO ₂ (%)	HCN (ppm)	Wind speed for entire event at 1-3 mph, changing directions.
		Vent 3							
7/7/12	9:25	Source	59	94	12.4	60	0.08	800	84
	9:30	Worker Exposure 1U	ND	ND	20.9	ND	0.00		Readings inside vent CH4 and HCN over limit.
	9:34	Worker Exposure 1D	ND	ND	20.9	ND	0.00		5 feet elevation above ground, one foot upwind
	9:40	Worker Exposure 5U	ND	ND	20.9	ND	0.00		5 feet elevation above ground, five feet upwind.
	9:42	Worker Exposure 5D	ND	ND	20.9	ND	0.00		5 feet elevation above ground, five feet downwind.
	9:44	Cross wind 1N	ND	ND	20.9	ND	0.00		Cross wind - 1 and 5 ft crosswind, same criteria
	9:46	Cross wind 1S	ND	ND	20.9	ND	0.00		
	9:49	Cross wind 5N	ND	ND	20.9	ND	0.00		
	9:53	Cross wind 5S	ND	ND	20.9	ND	0.00		
7/7/12	9:59	Perimeter 1	ND	ND	20.9	ND	0.00		Downwind
	10:03	Perimeter 2	ND	ND	20.9	ND	0.00		Move approximately 100 feet each direction.
	10:08	Perimeter 3	ND	ND	20.9	ND	0.00		Move approximately 100 feet each direction.
	11:15	MW-SS	ND	ND	20.9	ND	0.00		In casing.
	11:35	RCRA Sump	ND	ND	20.4	ND	0.20	2,000	VOC result = 0.7.
	11:41	RCRA Shack	ND	ND	20.9	ND	0.00		
		On Landfill							
7/7/12	11:50	East Cap Drain	ND	ND	20.9	ND	ND		6 inches off ground, one-half way up slope of LF
	11:55	SE Cap Drain	ND	ND	20.9	ND	ND		at all cap readings.
	12:00	SW Cap Drain	ND	ND	20.9	ND	ND		
	12:05	West Cap Drain	ND	ND	20.9	ND	ND		
	12:12	NW Cap Drain	ND	ND	20.9	ND	ND		
	12:18	NE Cap Drain	ND	ND	20.9	ND	ND		

Source Inside vent cap at elbow.

LEL - Lower Explosive Limit.

CH₄ - Methane.

O₂ - Oxygen. Ambient concentration typically 20.9 percent

H₂S - Hydrogen Sulfide.

HCN - Hydrogen Cyanide.

CO₂ - Carbon Dioxide. Ambient concentrations typically 300-600 ppm.

Notes: This air monitoring, done at request of ODEQ (Fredrick Moore), was not conducted using an approved Sampling and Analysis Plan (SAP).

Manufacturer's instructions were followed for use of portable air sampling equipment and both monitors were calibrated prior to use.

The HCN monitor was calibrated to a range of 0 - 100 ppm. The extended range is 100 - 500 ppm, but this data is outside the calibration limits.

The CO₂ monitor was zeroed to ambient conditions. The results do not include ambient CO₂ concentrations.



Table 1. Chemical Hazards

Analyte Name	Major Routes of Exposure	Symptoms associated with overexposure	Occupational Exposure Limits NIOSH REL	Oregon PEL	ACGIH TLV	LEL (% by volume)
Methane	Inhalation	Methane is nontoxic. It can, however, reduce the amount of oxygen in the air necessary to support life. Exposure to oxygen-deficient atmospheres (less than 18.5 %) may produce dizziness, nausea, vomiting, loss of consciousness, and death. At very low oxygen concentrations (less than 12 %) unconsciousness and death may occur without warning. It should be noted that before suffocation could occur, the lower flammable limit for Methane in air will be exceeded; causing both an oxygen deficient and an explosive atmosphere.	None established	1,000 ppm	1,000 ppm	5%
Oxygen	Inhalation	Oxygen deficient and oxygen enriched atmospheres pose potential hazards. Breathing 80% or more oxygen at atmospheric pressure for more than a few hours may cause nasal stuffiness, cough, sore throat, chest pain and breathing difficulty. Breathing oxygen at higher pressure increases the likelihood of adverse effects within a shorter time period. Breathing pure oxygen under pressure may cause lung damage and also central nervous system effects resulting in dizziness, poor coordination, tingling sensation, visual and hearing disturbances, muscular twitching, unconsciousness and convulsions. Breathing oxygen under pressure may cause prolongation of adaptation to darkness and reduced peripheral vision.	None established	None established	Oxygen deficient: <19.5% Oxygen enriched: >12.5%	None established
Hydrogen Sulfide	Inhalation, skin and/or eye contact	Irritation eyes, respiratory system; apnea, coma, convulsions; conjunctivitis, eye pain, lacrimation (discharge of tears), photophobia (abnormal visual intolerance to light), corneal vesiculation; dizziness, headache, lassitude (weakness, exhaustion), irritability, insomnia; gastrointestinal disturbance; liquid: frostbite	C 10 ppm [10 minute]	C 20 ppm	1 ppm	4.0%
Carbon dioxide	Inhalation, skin and/or eye contact (liquid/solid)	Headache, dizziness, restlessness, paresthesia; dyspnea (breathing difficulty); sweating, malaise (vague feeling of discomfort); increased heart rate, cardiac output, blood pressure; coma; asphyxia; convulsions; frostbite (liquid, dry ice)	TWA 5000 ppm, ST 30,000 ppm	5,000 ppm	5,000 ppm	None established
Hydrogen Cyanide	Inhalation, skin absorption, ingestion, skin and/or eye contact	Asphyxia; lassitude (weakness, exhaustion), headache, confusion; nausea, vomiting; increased rate and depth of respiration or respiration slow and gasping; thyroid, blood changes	ST 4.7 ppm [skin]	10 ppm	4.7 ppm ceiling	5.6%



Table 1. Chemical Hazards

Analyte Name	Major Routes of Exposure	Symptoms associated with overexposure	Occupational Exposure Limits NIOSH REL	Oregon PEL	ACGIH TLV	LEL (% by volume)
Hydrogen	Inhalation	Acts as a simple asphyxiant. Contact with rapidly expanding gases or liquids can cause frostbite.	None established	1,000 ppm	None established	4.0%
Nitrogen	Inhalation	Acts as a simple asphyxiant. Contact with rapidly expanding gases or liquids can cause frostbite.	None established	None established	None established	None established
Hydrofluoric Acid	Inhalation, ingestion, skin contact	Irritate nose, throat and respiratory system. Can cause nose and throat burns, lung inflammation, pulmonary edema and hypocalcemia (depletion of calcium) which if not properly treated can result in death.	None established	None established	0.5 ppm	None established
Acetylene	Inhalation, skin and/or eye contact (liquid)	Headache, dizziness; asphyxia; liquid: frostbite	C 2500 ppm	1,000 ppm	None established	2.5%
Phosphine	Inhalation, skin and/or eye contact (liquid)	Nausea, vomiting, abdominal pain, diarrhea, thirst; chest tightness, dyspnea (breathing difficulty); muscle pain; chills; stupor or syncope; pulmonary edema; liquid: frostbite	TWA 0.3 ppm, ST 1 ppm	0.3 ppm	0.3 ppm	1.79%
Ammonia	Inhalation, ingestion (solution), skin and/or eye contact (solution/liquid)	Irritation eyes, nose, throat; dyspnea (breathing difficulty), wheezing, chest pain; pulmonary edema; pink frothy sputum; skin burns, vesiculation; liquid: frostbite	TWA 25 ppm, ST 35 ppm	25 ppm	25 ppm	15%

Notes:

- NIOSH = National Institute for Occupational Safety and Health
- REL = recommended exposure limits
- ACGIH = American Conference of Governmental Industrial Hygienists
- TLV = threshold limit values
- LEL = lower explosive (flammable) limit in air, % by volume (at room temperature unless otherwise noted)
- PEL = permissible exposure limits
- ppm = parts per million
- TWA = time weighted average concentration for up to a 10-hour workday during a 40-hour workweek
- ST = short term exposure limit; abbreviation for STEL
- C = ceiling

Table 2. Action Levels

Site Worker Ambient Air Monitoring				
Analyte Name	Direct-Read Field Instrument	Action Level	Action to take	Manufacturer Recommended Respirators ¹
Methane	MX6 I-Brid®	10% of the LEL	Withdraw from source area, contact H&S, control explosive hazard, and don Level B.	Supplied Air Respirator
Oxygen	MX6 I-Brid®	<19.5% or >21.5%	Withdraw from source area, contact H&S, control explosive hazard, and don Level B.	N/A
Hydrogen Sulfide	MX6 I-Brid®	0.5 ppm	Withdraw from source area, contact H&S, and don Level B PPE.	Supplied Air Respirator
Carbon dioxide	MX6 I-Brid®	2500 ppm	Withdraw from source area, contact H&S, and don Level B PPE.	Supplied Air Respirator (ineffective sorbents)
Hydrogen Cyanide	MX6 I-Brid®	1 ppm	Withdraw from source area, contact H&S, and don Level B PPE.	(Full face piece with appropriate cartridges and filters) Supplied Air Respirator
Hydrogen	MX6 I-Brid®	10% of the LEL	Withdraw from source area, contact H&S, control explosive hazard, and don Level B.	N/A
Nitrogen	N/A	N/A	N/A	N/A
Hydrofluoric Acid	Colorimetric detector tube (0.25-30ppm measuring range; Sensidyne 156S or equivalent)	0.25 ppm	Withdraw from source area, contact H&S, and don Level B PPE.	N/A
Acetylene	MX6 I-Brid®	1250	Withdraw from source area, contact H&S, control explosive hazard, and don Level B.	N/A
Phosphine	MX6 I-Brid®	0.15 ppm	Withdraw from source area, contact H&S, and don Level B PPE.	Supplied Air Respirator (unknown sorbent effectiveness; fumigant)
Ammonia	MX6 I-Brid®	12.5 ppm	Withdraw from source area, contact H&S, and confirm continued use of Level C.	(Full face piece with appropriate cartridges and filters) Ammonia/Methylamine Respirator (irritation also provides warning)

Notes:

1. Manufacturer recommended respirators were obtained from 3M Respirator Selection Guide updated April 2011. See HASP Addendum text for recommended initial level of PPE and respirator upgrade requirements.

OEL = occupational exposure limit

LEL = lower explosive limit

N/A = not available

ppm = parts per million

H&S = project certified industrial hygienist and on site safety officer.



Figures



Trip to:

1700 E 19th St

the Dalles, OR 97058-3317

4.49 miles / 9 minutes

Notes

A 3313 W 2nd St, the Dalles, OR 97058-4186

- | | | |
|--|--|---------------------------------|
| | 1. Start out going northwest on W 2nd St toward Hostetler St W . Map | 0.07 Mi
0.07 Mi Total |
| | 2. Take the 1st left onto Hostetler St W . Map
<i>If you reach the end of W 2nd St you've gone about 0.2 miles too far</i> | 0.07 Mi
0.1 Mi Total |
| | 3. Hostetler St W becomes Hostetler Way W . Map | 0.02 Mi
0.2 Mi Total |
| | 4. Turn left onto W 6th St / US-30 . Map
<i>Spookys Pizza is on the corner</i>
<i>If you reach W 7th St you've gone about 0.1 miles too far</i> | 1.0 Mi
1.1 Mi Total |
| | 5. Merge onto I-84 E via the ramp on the left toward Pendleton . Map
<i>If you reach Webber St you've gone about 0.1 miles too far</i> | 1.8 Mi
2.9 Mi Total |
| | 6. Take EXIT 85 toward City Center / The Dalles . Map | 0.2 Mi
3.1 Mi Total |
| | 7. Turn right . Map
<i>If you reach I-84 E you've gone about 0.2 miles too far</i> | 0.1 Mi
3.3 Mi Total |
| | 8. Turn right onto E 2nd St / US-30 E . Map
<i>E 2nd St is 0.1 miles past Tie Plant Rd</i>
<i>If you are on E 2nd St and reach US-30 W you've gone about 1.2 miles too far</i> | 0.2 Mi
3.4 Mi Total |
| | 9. Enter next roundabout and take the 2nd exit onto Brewery Grade . Map | 0.3 Mi
3.8 Mi Total |
| | 10. Turn slight left onto E 9th St . Map | 0.02 Mi
3.8 Mi Total |
| | 11. Take the 1st right onto Dry Hollow Rd . Map
<i>If you reach Oregon Ave you've gone about 0.1 miles too far</i> | 0.3 Mi
4.1 Mi Total |
| | 12. Turn left onto E 14th St . Map
<i>E 14th St is just past E 13th Pl</i>
<i>If you are on Dry Hollow Rd and reach Montana St you've gone about 0.2 miles too far</i> | 0.1 Mi
4.2 Mi Total |
| | 13. Turn right onto Oregon Ave . Map | 0.2 Mi
4.4 Mi Total |
| | 14. Turn right onto E 19th St . Map | 0.06 Mi
4.5 Mi Total |
| | 15. 1700 E 19TH ST is on the left . Map
<i>If you reach Nevada St you've gone a little too far</i> | |

B 1700 E 19th St, the Dalles, OR 97058-3317

Total Travel Estimate: **4.49 miles - about 9 minutes**



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Job Safety Analyses

Job Safety Analysis

General

JSA ID	7794	Status	(4) Revise
Job Name	Environmental-Air Monitoring	Created Date	7/5/2012
Task Description	Physical hazards associated with Air/Gas monitoring at RCRA and CERCLA landfills	Completed Date	
Template	False	Auto Closed	False

Client / Project

Client	LOCKHEED MARTIN CORPORATION
Project Number	GP0006772012
Project Name	The Dalles
PIC	SHUKLA, NILESH
Project Manager	PETERS, LYNDEN

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Hine, Scott	9/11/2012		Magna, Elisabeth	<input checked="" type="checkbox"/>
HASP Reviewer	Merkle, Kurt			Beil, Kurt	<input checked="" type="checkbox"/>
Quality Reviewer	Vogelsong, William	6/27/2012	6/27/2012	Suarez, Gustavo	<input checked="" type="checkbox"/>
Reviewer	Walsh, Kimberly			Romaine, Kathleen	<input checked="" type="checkbox"/>

Job Steps

Job Step No.	Job Step Description	Potential Hazard	Critical Action	H&S Reference
1	Mobilize to site	1 Motion - driving motor vehicle	Refer to driving JLA 6812.	Refer to H&S handbook Section III (U)
2	Pre-operations	1 Environmental/Biological/Temperature	Read and fully understand the HASP and Addendum dated July 2012. Conduct Tailgate Health and Safety Meeting. Ask questions if anything is unclear. TRACK with every task performed and understand associated PPE prior to site work. Review weather conditions (Dalles Municipal Airport weather station: http://mesowest.utah.edu/cgi-bin/droman/meso_base.cgi?stn-KDLS) for wind advisory, wind direction and speed. Use STOP WORK as necessary.	H&S handbook Section III (A)
3	Instrument Calibration	1 Unstable readings/inaccuracy with instrument	Shut instrument down for a minute. Turn back on and let stabilization occur. Then recalibrate instrument. If this doesn't solve the issue proceed to following critical action (#2).	H&S handbook Sec. V (I)
		2 Unstable readings/Inoperative	Remove instrument from service and obtain a replacement. Communicate to SSO.	
4	Site Reconnaissance - air monitoring and sampling at the perimeter fence line	1 Gravity - slips, trips and falls	Assess safest line of path prior to moving forward. If appropriate, remove tripping hazards.	H&S handbook Section III (EE)- ergonomics
		2 Motion - Muscle strains	Do not bend over to obtain reading 2 feet off the ground. Bend at the knees instead with a straight back (crouch down).	Section V (I) - monitoring equipment
		3 Biological	Proper PPE: long sleeves, pants and insect repellent. Frequently check for ticks on exposed skin. Be cautious of snakes in surrounding area - watch footing, be alert of snake habitat (rocks, heavy brush). Stop work upon warning signs and leave area to re-assess situation.	
		4 Chemical	Refer to July 2012 HASP addendum for review of chemical hazards and control; conduct commentary hazard assessment.	

5	Mobilize to site sample locations	1	Gravity - slip, trips and falls	Assess safest line of path to destination. Always walk forward, looking ahead. Side step up steep slopes and be cautious of loose material under feet. Keep a low center of gravity. Have both hands free for balance (keep equipment/tools in backback).	
		2	Motion	Be aware of the motions surrounding you and the motions you are performing (TRACK). Avoid awkward body positions (bending over, twisting). Have any loose items secured to prevent be struck from wind. Know wind direction.	
		3	Chemical	Refer to July 2012 HASP addendum for chemical hazards and controls; conduct commentary hazard assessment.	
6	Ambient Air monitoring	1	Equipment malfunction	Do not spend lengthy time in close proximity (exposure areas) to vent/sump trying to fix/adjust equipment - relocate away from potential chemical source (stay up wind).	
		2	Chemical	Refer to July 2012 HASP addendum for chemical hazards and controls; conduct commentary hazard assessment.	
7	Measure air flowrate	1	Motion - hand injury, muscle strains	Wear butyl rubber work gloves when removing perforated caps on vents. Avoid awkward body positions - bend at the knees and keep a straight back. Keep breathing zone elevated above vent source. Be aware of wind direction - stay upwind if practical. Keep long probes pointed away from body and low to ground and be vocal when using such devices so all crew is aware.	
		2	Chemical	Refer to the July 2012 HASP addendum for chemical hazards and controls; conduct commentary hazard assessment.	
8	Sample collection: place tubing/probe into vent or sump	1	Confined Space	Know how to recognize confined spaces. Do not enter confined space without revision to the JLA and HASP addendum with review by program manager and health and safety professional. Stop work.	H&S handbook Section III (EE) - ergonomics & lifting manhole covers
		2	Hand injury - pinch points, lacerations	Wear butyl rubber work gloves when inserting tubing into u-shaped vents keeping breathing zone above the vent. Use manhole cover hook or lifter tool when moving manhole covers. Always use the right tools for the job.	
		3	Muscle strains	Avoid awkward body positions. Use proper lifting techniques during tubing/probe set up. Bend at the knees, keep a straight back. When lifting heavy objects, lift with the legs not the back; do not twist while lifting.	
		4	Motion	Avoid sudden movements while handling sampling/monitoring devices that are set up. Stay alert on wind conditions and adjust position accordingly.	
		5	Chemical	Refer to July 2012 HASP addendum for chemical hazards and controls; conduct commentary hazard assessment.	
9	Record concentrations from direct read air monitoring instrument(s).	1	Equipment malfunction/damage	Withdraw from source area. Purge the monitors until readings stabilize. Keep device on level surface while recording measurements.	

PPE Personal Protective Equipment			
Type	Personal Protective Equipment	Description	Required
Dermal Protection	coveralls	refer to the July 2012 HASP addendum	Required
Eye Protection	safety glasses	with side shields	Required
Foot Protection	steel-toe boots		Required
Hand Protection	work gloves (specify type)	refer to the July 2012 HASP addendum	Required
Head Protection	hard hat		Required
Miscellaneous PPE	other	refer to the July 2012 HASP addendum	Required
	traffic vest—Class II or III		Required

Supplies			
Type	Supply	Description	Required
Communication Devices	mobile phone		Required
	walkie talkie		Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
	Other	Refer to July 2012 HASP addendum	Required
	Other	manhole lift hook	Required
	Other		Required
Personal	eye wash (specify type)	personal	Required
	insect repellent		Required
	sunscreen		Required
	water/fluid replacement		Required

Review Comments		
Reviewer	Comments	
Employee: Walsh, Kimberly Role Reviewer Review Type Revise Completed Date 7/11/2012	Step 2 Critical Actions Section-Add "Recalibrate instrument" Step 3 Critical Action Section-Revise, 3 points of contact is typically in reference to ladders. Step 4 2nd Critical Action Section-Revise, it says full face respirators are to be used then says use of full face will be reviewed.	
Employee: Walsh, Kimberly Role Reviewer Review Type Revise Completed Date 7/19/2012	Will perform over-the-shoulder review for revision.	
Employee: Vogelsong, William Role Quality Reviewer Review Type NA Completed Date 6/27/2012	Excellent; consider Lockheed Martin H&S protocols as well.	

Job Safety Analysis

General

JSA ID	7930	Status	(3) Completed
Job Name	General Industry-Driving - Commercial Motor Vehicles	Created Date	7/19/2012
Task Description	Mobilizing to Site	Completed Date	07/24/2012
Template	False	Auto Closed	False

Client / Project

Client	LOCKHEED MARTIN CORPORATION
Project Number	GP0006772012
Project Name	The Dalles
PIC	SHUKLA, NILESH
Project Manager	PETERS, LYNDEN

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Hine, Scott	8/9/2012	7/19/2012	Magna, Elisabeth	<input checked="" type="checkbox"/>
HASP Reviewer	Merkle, Kurt	8/2/2012	7/24/2012	Beil, Kurt	<input checked="" type="checkbox"/>
Reviewer	Walsh, Kimberly	8/2/2012	7/20/2012	Romaine, Kathleen	<input checked="" type="checkbox"/>

Job Steps

Job Step No.	Job Step Description	Potential Hazard	Critical Action	H&S Reference
1	CMV Pre-Trip Inspection	1 Failure to perform inspection may lead to CMV accident, damage to CMV or regulatory citation. Weather/Road conditions.	Perform required pre-trip inspections by checking general condition of CMV. Sign the Post-Trip Inspection report from previous day or shift, if any deficiency corrected. Do not operate a CMV with an identified deficiency that will affect operation of CMV. Ensure emergency equipment is present, in good condition and unobstructed. Adjust planned travel route as necessary. Ensure all equipment is properly secured/tied down without obstructed views.	DOT Fact Sheets 007a and 006d H&S handbook Section III (U)
2	Cargo Inspection	1 Failure to inspect cargo may lead to unstable CMV operation, damage to cargo or CMV, CMV accident or regulatory citation.	Inspect cargo: Loaded properly in bed of truck or on trailer, adequately secured to prevent movement, inspect securing devices. Use edge protection if sharp edged cargo is present and using tiedowns. Use flagging to mark projecting loads. Ensure any required shipping papers are present and in order.	DOT Facts 006b
3	Enter and start vehicle	1 Opening/closing vehicle door 2 Overhead injury 3 Seats and mirrors 4 Engine/Electrical malfunction 5 Locking doors 6 Gas tank	Have hands free of personal items. Enter slowly and be aware of car height. Adjust seats and mirrors appropriately. Assure windows and mirrors area clean for best visibility. Assure all passengers buckle seat belts prior to driving away. Look and listen for abnormal conditions. If warning signs are present, STOP and re-assess situation. Assure doors are locked prior to driving away. Make sure gas is full prior to start of trip	
4	Pulling out of parking space.	1 Backing up 2 Obstructed views 3 Surrounding area - people/cars/obstacles	Utilize Smith System points. Use spotter. Use buddy system. Have passenger get out of vehicle for guidance. Assess surrounding area using passenger for assistance to make sure that all around the vehicle is clear.	

5	During Trip - Driving the CMV	<p>1 Improper operation of a CMV may result in accident, injury, death or regulatory citation.</p> <p>2 External factors - rocks/debris flying at vehicle, other drivers on road</p> <p>3 Weather (rain/fog/high wind), pot holes, uneven pavement, obstacles in the middle of the road.</p>	<p>Operate CMVs according to local speed laws. Only drive in approved lanes, where regulated. Maintain Smith System 5 Keys while driving, add seconds to 4 second rule when carrying heavy cargo. Keep eyes moving in all directions, including vertically. Use warning devices when stopped on side of roadway.</p> <p>Utilize the 5 key points of the smith driver system.</p> <p>Be aware/stay clear of abnormal road conditions. Always look 15 seconds ahead. Always keep two hands on the steering wheel.</p>	DOT Facts 005a and 005b
6	Slowing and Stopping the CMV	<p>1 Improper braking or stopping of a CMV may cause load shifts damaging cargo or CMV, create accident by rear ending other vehicles, or cause CMV to be struck by other vehicle or train.</p>	<p>Brake early and gradually, slow and proceed with caution at railroad grade crossings. Use gear shifting to aid in slowing CMV, if so equipped. Account for extra cargo weight when applying brakes.</p>	DOT Facts 005a
7	Backing and Parking - turning off engine	<p>1 Improper backing may result in striking other objects or persons</p> <p>2 Improper parking of CMV may create difficulty in leaving parking area potentially resulting in accident, or result in regulatory citation if parked illegally. Suspicious activity in area.</p>	<p>Avoid situations where backing will be required. Use Smith System, GOAL prior to backing or ARCADIS spotter program. Plan all backing - use a spotter whenever backing is required. Back slowly 1-3 mph. Keep eyes moving continuously and monitor front of the CMV as well as back of the CMV when backing. Avoid blind side backing situations.</p> <p>Use pull through parking when permitted. Park in open areas of parking lots and select routes that reduce exposure to pedestrians in parking lots. Use horn in a proactive manner to communicate with other drivers and pedestrians. Make sure to lock doors upon leaving the vehicle. Keep any remaining items left in the vehicle covered if possible or out of visible sight if possible.</p>	DOT Facts 005a
8	Exhiting vehicle	<p>1 Refer to step #3 potential hazards 1 and 2. External factors: ground conditions upon stepping out of vehicle.</p>	<p>Refer to step #3 critical actions 1 and 2. Mitigate external factors by observing the ground you are stepping onto when exhiting vehicle (TRACK).</p>	
9	Post Trip Inspection	<p>1 Vehicle damage</p>	<p>Check for abnormal leaking fluids underneath vehicle. Do a walk around to inspect general condition of the vehicle. Be aware of abnormal smells and or smoke being emitted from vehicle.</p>	

PPE Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Hand Protection	work gloves (specify type)	Leather during CMV equipment loading	Required
Miscellaneous PPE	traffic vest--Class II or III		Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone	Do not operate mobile phone while driving	Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
	flashlight		Required
	Other	Spare fuses	Required
Traffic Control	Other	Warning devices (triangles, etc.)	Required

Review Comments

Reviewer		Comments
Employee:	Merkle, Kurt	
Role	HASP Reviewer	
Review Type	Approve	
Completed Date	7/24/2012	
Employee:	Walsh, Kimberly	Two additional thoughts: rent the smallest vehicle that is fit for purpose (do not accept upgrades to larger vehicles than needed), always leave a three foot minimum space cushion between the vehicle and stationery objects.
Role	Reviewer	
Review Type	Approve	
Completed Date	7/20/2012	